

ABSTRACT

The invention according to one aspect provides oxygen sorbent materials, which are able to remove trace amounts of oxygen in either a gas-flow or an enclosed system over a wide temperature range. In particular, the invention relates to bulk solid oxygen sorbents that can lower equilibrium oxygen concentrations to below 1 part per trillion (1ppt). The oxygen sorbents have high surface area, nano-sized crystalline mixed oxides that include cerium oxide, zirconium oxide and preferably yttrium oxide, and an aliquot of catalytic materials such as precious metal. The present sorbents can work in noxious environments, since the materials are not sensitive to toxic elements, which would typically poison conventional catalysts. In another aspect, a product and method for fabricating an opto-electronic device that includes a getter material, incorporating an iteration of the sorbent material, is provided. The getter material operates by bulk transport and has a capacity to absorb and retain large quantities of oxygen per volume and other contaminants over a wide temperature range. This is a useful feature for opto-electronic – also known as photonic – devices, especially those with polymeric components, since they often suffer from photo-degradation caused by the presence of gaseous oxygen and other contaminants in the optical pathway.